

PATENT

Attorney Docket No. SPO-587/DIV

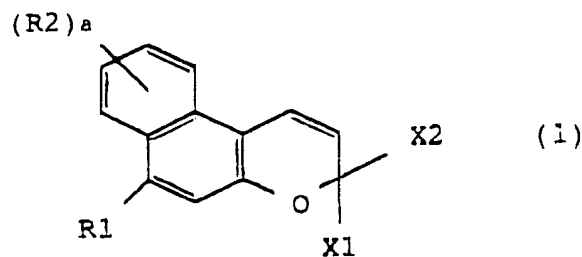
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:) Group Art Unit: 1626
)
 MOMODA; MATSUOKA; NAGOU) Examiner: A. SMALL
)
 Serial No. unknown)
)
 Filed: February 19, 2002)
)
 For: CHROMENE COMPOUNDS

Appendix B

Please amend the following claims as indicated in the following clean copy of the claims.

1. (Once Amended) A photochromic material containing a chromene compound represented by the following general formula (1),



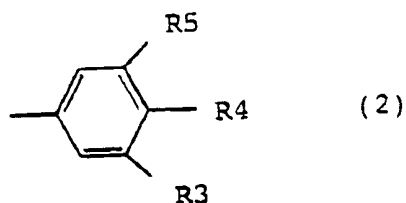
wherein R1 is a substituted amino group, a substituted or unsubstituted heterocyclic group having a nitrogen atom, as a hetero atom, bonded to a naphthopyran ring or a condensed heterocyclic group in which said heterocyclic group is condensed

with an aromatic hydrocarbon ring or an aromatic heterocyclic ring,

a R2 is an alkyl group, an alkoxyl group, an aralkoxyl group, an aralkyl group, a substituted amino group, a cyano group, a substituted or unsubstituted aryl group, a halogen atom, a substituted or unsubstituted heterocyclic group having, as a hetero atom, a nitrogen atom, bonded to the naphthopyran ring, or a condensed heterocyclic group in which said heterocyclic group is condensed with an aromatic hydrocarbon ring or an aromatic heterocyclic ring,

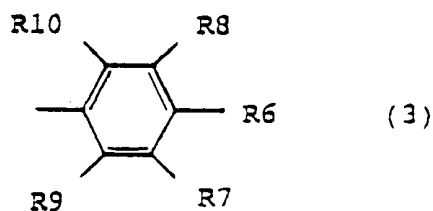
"a" is an integer of 0 to 3,

X1 is a group represented by the following formula (2),



wherein each of R3, R4 and R5 is a hydrogen atom, a substituted amino group, a substituted or unsubstituted heterocyclic group having a nitrogen atom, as a hetero atom, bonded to a benzene ring, or a condensed heterocyclic group in which said heterocyclic group is condensed with an aromatic hydrocarbon ring or an aromatic heterocyclic ring, but R3, R4 and R5 are not hydrogen atoms simultaneously, and

X2 is a group represented by the following formula (3),



wherein R6 is a hydrogen atom; an electron attractive group selected from the group consisting of a trifluoromethyl group, a trifluoromethoxy group, a cyano group, a sulfonyl group, an alkylsulfonyl group, an arylsulfonyl group and a nitro group; or an alkoxyl group,

each of R7 and R8 is (i) a hydrogen atom, an aliphatic hydrocarbon group having not less than three carbon atoms, a halogen atom, a trifluoromethyl group, a trifluoromethoxy group, a cyano group, a sulfonyl group, an alkylsulfonyl group, an arylsulfonyl group or a nitro group when R6 is not a hydrogen atom, or (ii) a hydrogen atom, a halogen atom, a trifluoromethyl group or a trifluoromethoxy group when R6 is a hydrogen atom,

each of R9 and R10 is a hydrogen atom, a cyano group, an alkoxyl group having 1 to 5 carbon atoms, a fluorine atom or a chlorine atom,

wherein, when R4 in the group represented by the above formula (2) is the substituted amino group, the substituted or unsubstituted heterocyclic group or is the condensed

heterocyclic group, R6 is not an alkoxyl group, and R6, R7, R8, R9 and R10 are not hydrogen atoms simultaneously.

2. (Once Amended) A photochromic material containing the chromene compound of claim 1, wherein in the group represented by the formula (3) in the above general formula (1):

R6, R7, R8, R9 and R10 are not hydrogen atoms simultaneously,

R6 is a hydrogen atom or an electron attractive group selected from the group consisting of a trifluoromethyl group, a cyano group, a sulfonyl group, an alkylsulfonyl group, an arylsulfonyl group and a nitro group,

when R6 is not a hydrogen atom, each of R7 and R8 is a hydrogen atom, an aliphatic hydrocarbon group having not less than 3 carbon atoms, a fluorine atom, a trifluoromethyl group, a cyano group, a sulfonyl group, an alkylsulfonyl group, an arylsulfonyl group or a nitro group, and

when R6 is a hydrogen atom, each of R7 and R8 is a hydrogen atom.

3. (Once Amended) A photochromic material containing the chromene compound of claim 1 wherein in the group represented by the formula (3) in the above general formula (1):

R6 is a hydrogen atom, an alkoxyl group or a trifluoromethoxy group,

a) each of R7 and R8 is a hydrogen atom, a halogen atom, a trifluoromethyl group or a trifluoromethoxy group, wherein both R7 and R8 are not hydrogen atoms, when R4 in formula (2) in the general formula (1) is the substituted amino group the substituted or unsubstituted heterocyclic group, or the condensed heterocyclic group, and

both R9 and R10 are hydrogen atoms.

4. (Once Amended) A photochromic optical material containing the chromene compound of claim 1.

5. (Once Amended) A photochromic optical material containing the chromene compound of claim 1.

6. (Once Amended) A photochromic optical material containing the chromene compound of claim 3.

7. (Once Amended) A photochromic polymerizable composition containing the chromene compound of claim 1 and a polymerizable monomer.

8. (Once Amended) A photochromic polymerizable composition containing the chromene compound of claim 2 and a polymerizable monomer is a (meth)acrylic acid ester compound.

9. (New) A photochromic polymerizable composition containing the chromene compound of claim 3 and a polymerizable monomer.

10. (New) The photochromic polymerizable composition of claim 7, further containing a polymerization initiator.

11. (New) The photochromic polymerizable composition of claim 8, further containing a polymerization initiator.

12. (New) The photochromic polymerizable composition of claim 9, further containing a polymerization initiator.

13. (New) The photochromic polymerizable composition of claim 7, wherein the polymerizable monomer is a (meth)acrylic acid ester compound.

14. (New) The photochromic polymerizable composition of claim 8, wherein the polymerizable monomer is a (meth)acrylic acid ester compound.

15. (New) The photochromic polymerizable composition of claim 9, wherein the polymerizable monomer is a (meth)acrylic acid ester compound.

16. (New) The photochromic polymerizable composition of claim 10, wherein the polymerizable monomer is a (meth)acrylic acid ester compound.

17. (New) The photochromic polymerizable composition of claim 11, wherein the polymerizable monomer is a (meth)acrylic acid ester compound.

18. (New) The photochromic polymerizable composition of claim 12, wherein the polymerizable monomer is a (meth)acrylic acid ester compound.
